

**WHAT IS CLAIMED IS:**

Sub 1  
1. A liquid crystal display system comprising:  
a liquid crystal display panel including a plurality of data lines, a plurality of gate lines intersecting the data lines, and a plurality of pixel electrodes arranged in a matrix type and each having a switch connected to one of the gate lines and one of the data lines;

5 a gate driver for successively applying a gate voltage to the gate lines to turn on the switches;

10 a data driver for applying a gray voltage, corresponding to image data signals, to the data lines; and

15 a timing controller for sending both the image data signals and a shift clock signal to the data driver, with a first signal wire through which the shift clock signal is transmitted, and a second signal wire through which a first clock signal having a frequency equal to the shift clock signal but having a phase difference of 90° to 270°.

2. The liquid crystal display system of claim 1 wherein the second signal wire is connected to a ground through a predetermined resistance value.

20 3. The liquid crystal display system of claim 2 wherein the first clock signal is generated in the timing controller.

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4. The liquid crystal display system of claim 2 wherein the first signal wire and the second signal wire are provided on a circuit board.

5. The liquid crystal display system of claim 4 wherein the circuit board is a multi-layered printed circuit board and the first signal wire and the second signal wire are formed in parallel on the same layer.

6. The liquid crystal display system of claim 4 wherein the circuit board is a multi-layered printed circuit board and the first signal wire and the second signal wire are formed on different layers.

7. The liquid crystal display system of claim 1 wherein the first clock signal has a 180° phase difference from the shift clock signal.

8. The liquid crystal display system of claim 7 wherein the data driver comprises a plurality of data driver integrated circuits for receiving the image data signals and the shift clock signal from the timing controller and applying the gray voltage corresponding to the image data signals to the data lines of the LCD panel.

9. The liquid crystal display system of claim 8 wherein the data driver integrated circuits comprise:

a shift register for shifting and storing the image data signals in synchronization with the shift clock signal after receiving the image data signals from the timing controller;

a D/A converter receiving the image data signals stored in the shift register and

converting the image data signals to a corresponding gray voltage; and

an output buffer for temporarily storing the gray voltage output from the D/A converter, and applying the gray voltage to the data lines of the liquid crystal display panel in units of lines.

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10. A liquid crystal display system comprising:

a liquid crystal display panel including a plurality of data lines, a plurality of gate lines intersecting the data lines, and a plurality of pixel electrodes arranged in a matrix type and each having a switch connected to one of the gate lines and one of the data lines;

a gate driver for successively applying a gate voltage to the gate lines to turn on the switches;

a circuit board including a timing controller for generating a first image data signal and a second image data signal and generating a first shift clock signal and a second shift clock signal with a phase difference of  $90^\circ$  to  $270^\circ$  that respectively shift the first image data signal and the second image data signal, a first image data signal wire and a second image data signal wire through which the first image data signal and the second image data signal are respectively transmitted, and a first shift clock signal wire and a second shift clock signal wire through which the first shift clock signal and the second shift clock signal are respectively transmitted;

a data driver receiving the first image data signal and the second image data signal and the first shift clock signal and the second shift clock signal from the timing controller, and applying a gray voltage corresponding to the first image data signal and

the second image data signal to the data lines.

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5 11. The liquid crystal display system of claim 10 wherein the first image data signals are odd image data signals, and the second image data signals are even image data signals.

12. The liquid crystal display system of claim 10, wherein the first shift clock signal and the second shift clock signal have a phase difference of  $180^\circ$ .

10 13. The liquid crystal display system of claim 12, wherein the first image data signal and the second image data signal have a phase difference of  $90^\circ$  to  $270^\circ$ .

15 14. The liquid crystal display system of claim 13 wherein the first image data signal and the second image data signal have a phase difference of  $180^\circ$ .

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15 15. The liquid crystal display system of claim 14 wherein the first image data signal is synchronized to a rising edge of the first shift clock signal, and the second image data signals is synchronized to a falling edge of the second shift clock signal.

20 16. The liquid crystal display system of claim 14 wherein a pulse width of the first shift clock signal and the second shift clock signal falls within the interval of a high signal or a low signal of the odd and even image data signals.

17. The liquid crystal display system of claim 13 wherein the first and second image data signals have a phase difference of  $90^\circ$  or  $270^\circ$ .

|      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
| 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
| 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 |
| 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 |
| 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 |
| 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 |
| 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 |
| 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 |
| 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 |
| 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 |
| 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 |
| 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 |
| 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 |
| 2173 | 2174 | 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 |
| 2186 | 2187 | 2188 | 2189 | 2190 | 2191 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 |
| 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 |
| 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 | 2224 |
| 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 |
| 2238 | 2239 | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 |
| 2251 | 2252 | 2253 | 2254 | 2255 | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 |
| 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 | 2272 | 2273 | 2274 | 2275 | 2276 |
| 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 | 2288 | 2289 |
| 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 |
| 2303 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 |
| 2316 | 2317 | 2318 | 2319 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 |
| 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 |
| 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 | 2353 | 2354 |
| 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 |
| 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 |
| 2381 | 2382 | 2383 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 |
| 2394 | 2395 | 2396 | 2397 | 2398 | 2399 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 |
| 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 |      |      |      |      |      |      |